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## CHABA

### THIRD ANNUAL REPORT

JUNE 1956

Technical Report No. 9  
to the Office of Naval Research  
from the Central Institute for the Deaf  
Contract No. Nour 1151 (01), NR 140-009

CHABA

THIRD ANNUAL REPORT  
OF THE  
ARMED FORCES-NATIONAL RESEARCH COUNCIL  
COMMITTEE ON HEARING AND BIO-ACOUSTICS

1 June 1955 to 31 May 1956

Prepared by  
Hallowell Davis  
Donald H. Eldredge  
J. Richardson Usher  
and Staff of the  
Office of the Executive Secretary

Armed Forces-National Research Council  
Committee on Hearing and Bio-Acoustics

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Central Institute for the Deaf  
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Technical Report No. 9  
to the Office of Naval Research  
Contract No. Nonr 1151 (01), NR 140-069

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## SUMMARY OF THIRD ANNUAL REPORT

The Armed Forces-National Research Council Committee on Hearing and Bio-Acoustics held one full meeting during the year covered by this Report. The major topic discussed at the meeting was "The Testing of Hearing in the Armed Services." The Proceedings of this meeting will be published as CHABA Report No. 5.

The CHABA Council met three times during the year, and accepted formal or informal reports from eleven Working Groups. Six new Working Groups were appointed, one was reactivated, and eleven Working Groups were discharged. On 31 May 1956 five Working Groups were active.

The activities of the several Working Groups are summarized in the body of this report.



BY-LAWS OF THE  
ARMED FORCES-NATIONAL RESEARCH COUNCIL COMMITTEE  
ON HEARING AND BIO-ACOUSTICS

1. The name of this Committee shall be the Armed Forces-National Research Council Committee on Hearing and Bio-Acoustics.
2. The purpose of this Committee shall be to consider problems of a scientific and technical nature concerning the direct and indirect effects of acoustic energy (sound, vibration and blast) on man. These problems, among others of a related nature, include:
  - a. Hearing; including auditory physiology, psycho-acoustics, auditory standards;
  - b. Communications, particularly speech communications in noise;
  - c. The psychological and social reactions of man to noise;
  - d. The auditory and non-auditory effects of high-intensity acoustic energy on man;
  - e. The means of protection against the undesirable effects of acoustic energy;
  - f. The relevant physical and engineering problems of the generation, measurement and control of acoustic energy.

In consideration of these problems, the Committee shall collect, collate, and distribute information and may recommend such action as shall be in the national interest.
3. There shall be three classes of members of this Committee: Council Members, Members and Affiliated Members.
  - a. There shall be a Council to consist of nine members appointed as follows: one representative from each of the three Armed Forces; three representatives named by the National Research Council; an Executive Secretary chosen by the other Council members; and such additional members, chosen by the Council, as are required to bring the total to nine. Members of the Council shall normally serve for three consecutive years, or until their successors have been appointed and take office.

b. Members of the Committee shall be such additional persons as are appointed by the Armed Forces or the National Research Council. They shall be persons qualified by the nature of their training and experience, or their employment, to contribute to the purposes of the Committee. Normally, one or two representatives of each administrative unit in the Armed Forces having direct cognizance of the problems in hearing and bio-acoustics shall be included. Others shall be engineers and scientists who are qualified by training, experience, or employment in the fields of acoustics and vibration, psychology, physiology, or medicine. Members of the Committee shall continue to serve at the pleasure of the appointing agency. The Committee will reimburse the civilian National Research Council appointed members for expenses while serving at designated meetings.

c. Other agencies of the government having cognizance of problems in hearing and bio-acoustics, and professional and industrial organizations having similar interests, may be invited at the discretion of the Council to appoint Affiliated Members to the Committee. Except as such Affiliated Members may happen to be Members under paragraph 3b above, they serve as representatives of the agency or organization which shall have appointed them, and the appointing agency shall be responsible for their term of service, replacement, expenses while serving, etc. The appointing agency shall keep the Executive Secretary informed at all times who its authorized representative is.

4. The Council is empowered to take all actions necessary to carry out the work of the Committee except for those actions delegated to the Committee.

a. The Council shall elect a Chairman and a Deputy Chairman from its own members. The Chairman shall preside at all meetings of the Council and of the Committee and exercise the usual duties of a chairman. The Deputy Chairman shall perform the duties of the Chairman in the case of his absence or inability to serve. The term of office of the Chairman and Deputy Chairman shall be two years.

b. The Council shall select an Executive Secretary as provided under paragraph 3a above. The Executive Secretary is empowered to receive and disburse funds for the Committee, to employ technical and professional assistance, to answer routine inquiries in the name of the Committee, and to call, with the concurrence of two other members of the Council, special meetings of the Council. The Executive Secretary shall carry out such projects as the Council shall direct. He shall report on his interim activities at each regular meeting of the Council and

shall prepare and distribute to the Council minutes of their meetings, and, at the direction of the Council, reports or publications of the Committee which are necessary or desirable.

c. The Council shall have two regular meetings per year at a time to be agreed upon not later than the last previous regular meeting of the Council. Special meetings may be called, as provided in paragraph 4b, upon not less than five days notice to all Council members.

d. A quorum of the Council shall consist of a majority of the qualified members. Each member of the Council may have a deputy serve in his stead at any meeting which he is unable to attend. A quorum shall require the presence of not less than three regularly appointed members of the Council.

5. The work of the Committee may be carried out in any manner approved by the Council including the following:

a. Meetings of the full Committee at which scientific and technical reports may be presented, or problems may be laid before the group for discussion and recommendations.

b. The appointment of Working Groups to consider specific issues brought to the Committee, such Working Groups to prepare their findings and recommendations for presentation to the Council.

c. The encouragement and sponsorship of publications and other activities which will result in the more effective distribution of our present knowledge about hearing and bio-acoustics.

6. These By-Laws may be amended by two-thirds vote of the regularly appointed members of the Council, following which the changes shall be submitted promptly to the National Research Council and to the Armed Forces for their concurrence.

7. Actions taken at the meeting of representatives of the National Research Council and of the Armed Forces, held at the Bureau of Medicine and Surgery on December 15, 1952 are ratified as enabling action in the formation of this Committee. These By-Laws shall take effect with the appointment of the first six members of the Council.

## MEMBERSHIP LIST

1 June 1955 - 31 May 1956

### THE COUNCIL

#### NRC Appointees-(Appointments terminate 30 June)

Dr. R. H. Bolt (Deputy-Chairman  
1955-57)  
Acoustics Laboratory  
Massachusetts Institute of  
Technology  
Cambridge 39, Massachusetts

Dr. Harvey Fletcher (1953-56)  
Director of Research  
Brigham Young University  
Provo, Utah

Dr. William D. Neff (1955-58)  
Section of Bio-Psychology  
Faculty Exchange  
University of Chicago  
Chicago 37, Illinois  
(appointed 12 July 1955)

Dr. Edwin B. Newman (1953-55)  
Psychological Laboratories  
Memorial Hall  
Harvard University  
Cambridge 38, Massachusetts  
(relieved 1 July 1955)

#### Army Representative

Major James P. Albrite (MC) USA  
Director, Audiology and Speech  
Correction Center  
Walter Reed Army Medical Center  
Washington 12, D. C.  
(relieved 25 October 1955)

Col. Charles S. Gersoni (MSC) USA  
Chief, Human Resources Research  
Branch  
Research and Development Division  
Office of the Surgeon General  
Department of the Army  
Washington 25, D. C.  
(designated 3 Sept. 1954)

#### Navy Representative

Captain Clifford P. Phoebus (MC)  
USN (Chairman 1955-57)  
Special Assistant for Bio  
Sciences  
Office of Naval Research  
Department of the Navy  
Washington 25, D. C.  
(designated 18 October, 1954)

#### Air Force Representative

Dr. Horace O. Parrack  
Coordinator of Noise and  
Vibration Control  
Attn: WCRDO (NVC)  
Wright Air Development Center  
Wright-Patterson Air Force Base,  
Ohio

#### Alternate:

Col. Charles H. Roadman (MC) USAF  
Chief, Human Factors Division  
Directorate of Research and  
Development  
Office, Deputy Chief of Staff  
Headquarters, United States  
Air Force  
Washington 25, D. C.

#### Members at Large - (Appointments terminate 30 June)

Dr. Hallowell Davis (Executive  
Secretary 1953-59)  
Central Institute for the Deaf  
818 South Kingshighway  
St. Louis 10, Missouri

Prof. Walter A. Rosenblith  
Acoustics Laboratory  
Massachusetts Institute of  
Technology  
Cambridge 39, Massachusetts

Dr. T. L. K. Smull  
National Advisory Committee for  
Aeronautics  
1512 H Street, N. W.  
Washington, D. C.

Technical Aide

Dr. Donald H. Eldredge  
Central Institute for the Deaf  
818 South Kingshighway  
St. Louis 10, Missouri

THE COMMITTEE

NATIONAL RESEARCH COUNCIL APPOINTED MEMBERS

One Year Appointments Beginning 1 July 1955

Dr. Harlow Ades (1955)  
Department of Anatomy  
The University of Texas  
Southwestern Medical School  
5323 Harry Hines Blvd.  
Dallas 19, Texas

Dr. C. I. Barron (1954-55)  
Medical Director, California  
Division  
Lockheed Aircraft Corporation  
Burbank, California

Dr. Leo L. Beranek (1955)  
Bolt, Beranek and Newman  
16 Eliot Street  
Cambridge 38, Massachusetts

Dr. Raymond Garhart (1953-55)  
School of Speech  
Northwestern University  
Evanston, Illinois

Dr. Grant Fairbanks (1953-55)  
335 Illini Hall  
University of Illinois  
Urbana, Illinois

Dr. Robert O. Fehr (1953-55)  
General Engineering Laboratory  
General Electric Company  
One River Road  
Schenectady 5, New York

Dr. Wendell R. Gannec (1954-55)  
Department of Psychology  
The Johns Hopkins University  
Baltimore 10, Maryland

Dr. Aram Glorig (1953-54; NRC 1955)  
111 North Bonnie Brae  
Los Angeles 26, California

Dr. Ward Halstead (1955)  
Department of Medicine  
University of Chicago  
Chicago 37, Illinois

Dr. Cyril M. Harris (1953-55)  
Director, Acoustics Laboratory  
Columbia University  
632 West 125th Street  
New York 27, New York

Dr. Ira J. Hirsh (1955)  
Central Institute for the Deaf  
818 South Kingshighway  
St. Louis 10, Missouri

Dr. Gordon D. Hoople (1953-55)  
University of Syracuse  
1100 East Genesee Street  
Syracuse 10, New York

Dr. Howard P. House (1953-55)  
1136 West Sixth Street  
Los Angeles 17, California

Mr. W. A. Kuhrt (1953-55)  
Chief, Gas Dynamic Projects  
United Aircraft Corporation  
Research Department  
East Hartford 8, Connecticut

Dr. Ralph A. Leedy (1953-55)  
Armour Research Foundation of  
Illinois Institute of Technology  
35 West Cermak Street  
Chicago, Illinois

Dr. J. C. R. Licklider (1954-55)  
Massachusetts Institute of Tech.  
Cambridge 39, Massachusetts

Dr. John R. Lindsay (1953-55)  
Department of Surgery  
The University of Chicago  
950 East 59th Street  
Chicago 37, Illinois

Dr. Osman K. Mawardi (1953-55)  
Acoustics Laboratory  
Massachusetts Institute of Tech.  
Cambridge 39, Massachusetts

Dr. George A. Miller (1953-55)  
Psychological Laboratories  
Memorial Hall  
Harvard University  
Cambridge 38, Massachusetts

Dr. W. A. Munson (1953-55)  
Bell Telephone Laboratories, Inc.  
Whippany, New Jersey

Dr. Edwin B. Newman (1953-55)  
Psychological Laboratories  
Memorial Hall  
Harvard University  
Cambridge 38, Massachusetts

Dr. Gordon E. Peterson (1955)  
Speech Clinic  
University of Michigan  
1007 East Huron Street  
Ann Arbor, Michigan

Dr. Wayne Rudmose (1954-55)  
Southern Methodist University  
Dallas 5, Texas

Dr. Isadore Rudnick (1953-55)  
Department of Physics  
University of California  
Los Angeles 24, California

Dr. Harold F. Schuknecht (1955)  
Henry Ford Hospital  
Detroit 2, Michigan

Dr. Abe Silverstein (1954-55)  
Associate Director  
Lewis Flight Propulsion Lab.  
21000 Brookpark Road  
Cleveland 11, Ohio

Dr. S. S. Stevens (1953-55)  
Psycho-Acoustics Laboratory  
Memorial Hall  
Harvard University  
Cambridge 38, Massachusetts

#### ARMY DESIGNATED MEMBERS

Major James P. Albrite (MC) USA  
Director, Audiology and Speech  
Correction Center  
Walter Reed Army Medical Center  
Washington 12, D. C.  
(relieved 25 October, 1955)

Dr. Ben Ami Blau  
Human Engineering Laboratory  
Aberdeen Proving Ground, Maryland  
(designated 1 August 1955)

Dr. Robert A. Butler  
Audiology and Speech Correction  
Center  
Walter Reed Army Medical Center  
Washington 12, D. C.  
(designated 31 March 1955)

Dr. R. L. Cramer  
Army Medical Research Laboratory  
Fort Knox, Kentucky  
(designated 25 November 1955)

Lt. Paul D. Coleman  
Army Medical Research Laboratory  
Fort Knox, Kentucky  
(relieved 25 November 1955)

1st Lt. John L. Fletcher (MSC) USA  
Psychology Department  
Army Medical Research Laboratory  
Fort Knox, Kentucky  
(designated 25 November 1955)

Dr. Robert Galambos  
Neuropsychiatry Division  
Army Medical Service Graduate Sch.  
Walter Reed Army Medical Center  
Washington 12, D. C.  
(designated 1953)

Colonel John R. Hall, Jr. (MC) USA  
Chief, Occupational Health Branch  
Preventive Medicine Division  
Office of the Surgeon General  
Room 2522, Main Navy Building  
Washington 25, D. C.  
(designated 3 September 1955)

Dr. Howard W. Hembree  
Headquarters, Quartermaster  
Research and Development Command  
Natick, Massachusetts  
(designated 2 March 1955)

Dr. M. Loeb  
Army Medical Research Laboratory  
Fort Knox, Kentucky  
(relieved 25 November 1955)

Col. C. B. Meador (MC) USA  
Office of the Chief, Physical  
Standards  
Professional Division  
Office of the Surgeon General  
Department of the Army  
Washington 25, D. C.  
(designated 25 November 1955)

Dr. David McK. Rioch  
Technical Director, Neuropsychiatry  
Division  
Army Medical Service Graduate Sch.  
Walter Reed Army Medical Center  
Washington 12, D. C.  
(designated 1953)

Dr. Leonard S. Rubin  
Chemical Corps Medical Laboratories  
Edgewood Arsenal, Maryland  
(designated 31 March 1955)

Dr. R. Edwin Shutts, Chief Supervis.  
Audiology and Speech Correction  
Center  
Walter Reed Army Medical Center  
Washington 12, D. C.  
(designated 4 January 1955)

Lt. Col. Franklin L. Spann (MC) USA  
Chief, ENT Service  
Walter Reed Army Hospital  
Washington 12, D. C.  
(designated 4 January 1955)

Dr. Robert Y. Walker  
Chief, Psychology Department  
Army Medical Research Laboratory  
Fort Knox, Kentucky  
(designated 25 November 1955)

Mr. Maurice B. Whitlock, Jr.  
Audiology and Speech Correction  
Center  
Walter Reed Army Medical Center  
Washington 12, D. C.  
(designated 31 March 1955)

#### AIR FORCE DESIGNATED MEMBERS

Lt. Col. John E. Boyson USAF (MC)  
Office of the Air Surgeon (MCD)  
Headquarters Air Materiel Command  
Wright-Patterson Air Force Base  
Ohio  
(designated May 1953)

Dr. Charles W. Bray  
Headquarters, Human Resources  
Research Center  
Attention: DCS/O  
Lackland Air Force Base  
San Antonio, Texas  
(designated 9 May 1953)

Mr. Francis A. Brogan  
USAF School of Aviation Medicine  
Randolph Air Force Base  
Randolph Field, Texas  
(designated 7 July 1953)

Deputy Member:

Col. Henry M. Sweeny USAF  
USAF School of Aviation Medicine  
Randolph Air Force Base  
Randolph Field, Texas  
(designated 9 May 1953)

Mr. Willis J. Brown  
Wright Air Development Center  
Attn: WCLPO-1  
Wright-Patterson Air Force Base  
Ohio  
(relieved 3 April 1956)

Deputy Member:

Captain E. C. Simpson USAF  
Wright Air Development Center  
Attn: WCLPO-1  
Wright-Patterson Air Force Base  
Ohio  
(designated 9 May 1953)

Lt. Col. J. C. Carmichael USAF (MSC)  
Headquarters, Air Materiel Command  
Attn: MCDPE  
Wright-Patterson Air Force Base  
Ohio  
(designated 26 September 1955)

Dr. Julien Christensen  
Wright Air Development Center  
Attn: WCRDP  
Wright-Patterson Air Force Base  
Ohio  
(designated 9 May 1953)

Deputy Member:

Dr. Harry J. Jerison  
Wright Air Development Center  
Attn: WCRDP  
Wright-Patterson Air Force Base  
Ohio  
(designated 10 October 1954)

Mr. D. A. Dickey  
Wright Air Development Center  
Attn: WCLB  
Wright-Patterson Air Force Base  
Ohio  
(designated 9 May 1953)

Deputy Member:

Major Allen Watton, Jr. USAF  
Wright Air Development Center  
Attn: WCLBS  
Wright-Patterson Air Force Base  
Ohio  
(designated 9 May 1953)

Col. G. K. Fair USAF  
Chief, Aviation Medicine Division  
Office of the Surgeon General  
Headquarters, United States Air  
Force  
Washington 25, D. C.  
(designated 9 September 1955)

Dr. H. E. von Gierke  
Wright Air Development Center  
Attn: WCRDB-5  
Wright-Patterson Air Force Base  
Ohio  
(designated 9 May 1953)

Deputy Member:

Major Elizabeth Guild USAF  
Wright Air Development Center  
Attn: WCRDB-5  
Wright-Patterson Air Force Base  
Ohio  
(designated 9 May 1953)

Dr. A. W. Hetherington  
Headquarters, Air Research and  
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P.O. Box 1395  
Attn: RDDH-2  
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Deputy Member:

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Headquarters, Air Research and  
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P.O. Box 1395  
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C. M. Kos, M.D.  
Professor, Department of  
Otolaryngology and  
Maxillofacial Surgery  
University Hospital  
State University of Iowa  
Iowa City, Iowa  
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Office of the Surgeon General  
Headquarters, United States Air  
Force  
Washington 25, D.C.)  
(designated 9 September 1955)

Lt. Col. Ralph N. Kraus USAF  
USAF School of Aviation Medicine  
Randolph Air Force Base  
Randolph Field, Texas  
(designated 30 June 1955)

Dr. Karl Kryter  
AF Operational Applications  
Laboratory

Air Force Cambridge Research Center  
Bolling Air Force Base  
Washington 25, D. C.  
(designated 9 May 1953)

Deputy Member:

Dr. Irwin Pollack  
AF Operational Applications  
Laboratory  
Air Force Cambridge Research Cent.  
Bolling Air Force Base  
Washington 25, D.C.  
(designated 9 May 1953)

Lt. Col. Phillip J. Maher, Jr. USAF  
Headquarters United States Air Force  
Attn: AFDRD-HF  
Washington 25, D.C.  
(designated 9 May 1953)

Lt. Col. Alvin F. Meyer, Jr. USAF  
Office of the Surgeon (MSC)  
Headquarters, Strategic Air Command  
Offutt Air Force Base, Nebraska  
(designated 9 May 1953)

Major Richard K. Miller USAF  
Chief, Aircrew Standards Branch  
Physical Standards Division  
Office of the Surgeon General  
Headquarters, United States Air Force  
Washington 25, D. C.  
(designated 9 May 1953)

Lt. Col. C. N. Moss USAF (MC)  
Industrial Medical Officer  
Preventive Medicine Division  
Office of the Surgeon General  
Headquarters, United States Air Force  
Washington 25, D.C.  
(designated 9 September 1955)

Mr. Edward Poth, Chief  
Sanitary and Industrial Hygiene  
Engineering Branch  
USAF Dispensary  
Kelly Air Force Base  
San Antonio, Texas  
(designated 9 May 1953)

Dr. O. R. Rogers  
Wright Air Development Center  
Attn: WCLSY  
Wright-Patterson Air Force Base, Ohio  
(designated 9 May 1953)

Deputy Member:

Mr. G. L. Getline  
Wright Air Development Center  
Attn: WCLSY  
Wright-Patterson Air Force Base  
Ohio  
(relieved 22 May 1956)

Mr. Donald M. Ross  
Chief, Operations Section  
Plans and Operations Office  
Power Plant Laboratory  
Wright Air Development Center  
Attn: WCLPO-1  
Wright-Patterson Air Force Base  
Ohio  
(designated 12 April 1956)

Major R. F. Thompson USAF (MSC)  
Preventive Medicine Division  
Office of the Surgeon General  
Headquarters, United States Air  
Force  
Washington 25, D.C.  
(designated 9 September 1955)

Mr. Weiant Wathen-Dunn  
Air Force Cambridge Research Center  
L. G. Hanscom Field  
Bedford, Massachusetts  
(designated 9 May 1953)

#### NAVY DESIGNATED MEMBERS

Mr. Wilbert Annis, Head  
Acoustics Branch, Earth Sciences  
Division  
Office of Naval Research  
Department of the Navy  
Washington 25, D.C.  
(designated 18 March 1953)

Dr. John W. Black  
Department of Speech  
Ohio State University  
Columbus, Ohio  
(U.S. Naval School of Aviation Med.  
U.S. Naval Air Station  
Pensacola, Florida)

#### Alternate:

Dr. Gilbert Tolhurst  
U.S. Naval School of Aviation Med.  
U.S. Naval Air Station  
Pensacola, Florida  
(designated 20 December 1954)

Cdr. S. I. Brody (MC) USN  
Bureau of Aeronautics  
Room 1 W45, "W" Building  
Department of the Navy  
Washington 25, D.C.  
(relieved 13 January 1956)

Dr. J. T. Dailey  
Technical Director, Research Div.  
Bureau of Naval Personnel  
Department of the Navy  
Washington 25, D.C.  
(designated 29 January 1953)

#### Alternate:

Mr. Victor Fields  
Assistant Head, Classification  
and Survey Research Branch  
Bureau of Naval Personnel  
Department of the Navy  
Washington 25, D.C.  
(designated 29 January 1953)

Captain Thomas Ferwerda (MC) USN  
Medical Military Specialties Branch  
Research Division  
Bureau of Medicine and Surgery  
Department of the Navy  
Washington 25, D.C.  
(retired April 1956)

Mr. William J. Finney  
Naval Research Laboratory  
Washington 25, D.C.  
(designated 11 March 1953)

Mr. Robert S. Gales  
Head, Psychophysics Branch  
Human Factors Division  
U.S. Navy Electronics Laboratory  
San Diego 52, California  
(designated 5 March 1953)

Lt. Cdr. David E. Goldman (MSC) USN  
Scientific Liaison Officer  
Office of Naval Research

Department of the Navy  
Navy 100, Box 39  
Fleet Post Office, New York, N.Y.  
(designated 11 March 1953)

Cdr. Alan D. Grinsted (MSC) USN  
Aviation Medicine Division, Code 537  
Bureau of Medicine and Surgery  
Department of the Navy  
Washington 25, D.C.  
(designated 19 September 1955)

Dr. Fred Harbert  
Professor of Otolaryngology  
Jefferson Medical College  
1025 Walnut Street  
Philadelphia 7, Pennsylvania  
(designated 13 December 1955)

Dr. J. Donald Harris  
Head, Sound Branch, Research Div.  
U.S. Naval Medical Research Lab.  
U.S. Naval Submarine Base  
New London, Connecticut  
(designated 11 March 1953)

Alternate:

Dr. Richard H. Ehmer  
U.S. Naval Medical Research Lab.  
U.S. Naval Submarine Base  
New London, Connecticut  
(designated 27 October 1955)

Cdr. W. L. Jones (MC) USN  
Room 1 W45, "W" Building  
Department of the Navy  
Washington 25, D.C.  
(designated 13 January 1956)

Mr. Morris W. Lindman  
Bureau of Ships, Code 371  
Department of the Navy  
Washington 25, D.C.  
(designated 9 February 1956)

Mr. Emanuel S. Mendelson  
Head, Human Engineering Division  
Naval Air Materiel Center, NAES  
Philadelphia 12, Pennsylvania  
(designated 11 March 1953)

Dr. Clifford P. Seitz  
Special Devices Center  
Sands Point  
Fort Washington, New York

Capt. L. B. Shone (MC) USN  
Preventive Medicine Division  
Bureau of Medicine and Surgery  
Department of the Navy  
Washington 25, D.C.  
(designated 20 July 1955)

Cdr. J. Siegel (MSC) USN  
Preventive Medicine Division  
Bureau of Medicine and Surgery  
Department of the Navy  
Washington 25, D.C.  
(designated 20 July 1955)

Dr. Arnold M. Small  
Human Factors Division  
U.S. Navy Electronics Laboratory  
San Diego 52, California  
(relieved 23 April, 1956)

Mr. H. A. Thorpe  
Applied Science Division  
Bureau of Ships, Code 371  
Room 3727, Main Navy Building  
Washington 25, D.C.  
(relieved 6 February 1956)

Alternate:

Mr. Walter K. Dau, Jr.  
Ship Technical Division  
Bureau of Ships, Code 565  
Room 4425, Main Navy Building  
Washington 25, D.C.  
(designated 11 October 1954)

Dr. Richard Trumbull  
Head, Physiological Psychology  
Branch  
Office of Naval Research  
Department of the Navy  
Washington 25, D.C.  
(designated 20 December 1954)

Dr. John C. Webster  
U.S. Navy Electronics Laboratory  
San Diego 52, California  
(designated 23 April 1956)

## AFFILIATED MEMBERS

<u>Organization</u>	<u>Member</u>
British Joint Services Mission	<p>Wing Cdr. E. Bruce Harvey  British Joint Services Mission  Air Force Staff  1800 K Street, NW  Washington, D.C.</p> <p>Surgeon Cdr. Frank P. Ellis, RN  British Joint Services Mission Medical Staff  Room 5302, Building 5  Bureau of Medicine and Surgery,  Potomac Annex  Department of the Navy  Washington 25, D.C.</p>
Canadian Defence Research Board	<p>Dr. W. J. McNally  1509 Sherbrooke Street West  Montreal 25, Quebec  Canada</p> <p><u>Alternate:</u></p> <p>Dr. Keith K. Neely  Defence Research Medical Laboratories  P.O. Box 62, Postal Station K  Toronto 12, Ontario  Canada</p>
Canadian Joint Staff	<p>Wing Commander R. F. Lowry  Staff Officer Medical Services (Air)  Canadian Joint Staff  2450 Massachusetts Avenue, N.W.  Washington 8, D.C.</p>
Civil Aeronautics Administration	<p>Mr. Malcolm Y. McCormick  Department of Commerce  Civil Aeronautics Administration  Washington, D.C.</p> <p><u>Alternate:</u></p> <p>Mr. S. W. Rolle, Chief  Power Plant Branch  Civil Aeronautics Administration  Washington 25, D.C.</p>

Civil Aeronautics Board

Mr. John M. Chamberlain  
Director, Bureau of Safety Regulation  
Civil Aeronautics Board  
Washington 25, D.C.

National Advisory Committee  
for Aeronautics

Mr. T. L. K. Smull  
National Advisory Committee for  
Aeronautics  
1512 H. St. N.W.  
Washington 25, D.C.

National Bureau of  
Standards

Dr. Richard K. Cook  
National Bureau of Standards  
Washington 25, D.C.

National Institute of  
Neurological Diseases  
and Blindness

Dr. Henry A. Imus  
National Institute of Neurological  
Diseases and Blindness  
Bethesda 14, Maryland

Bureau of State Services,  
U.S. Public Health  
Service

Mr. Charles D. Yaffee  
Occupational Health Field Headquarters  
U.S. Public Health Service  
1014 Broadway  
Cincinnati

Alternate:

Mr. Edward Weiss  
Occupational Health Field Headquarters  
U.S. Public Health Service  
1014 Broadway  
Cincinnati, Ohio

## CALENDAR OF MEETINGS

24 October 1955	Ninth Council Meeting
25-26 October 1955	Third Annual Committee Meeting
5-6 December 1955	Tenth Council Meeting
1-2 March 1956	Eleventh Council Meeting

### Summary of Council Meetings

Ninth Council Meeting: 24 October 1955

Captain Clifford Phoebus was elected Chairman for the years 1955-1957 to succeed Dr. R. H. Bolt. Dr. Bolt was elected Deputy Chairman for the same period.

The Council accepted interim reports from Working Groups 18, 19, 21 and 22. Final reports were rendered by Working Groups 9, 14, 15, and 23, and the Council discharged them as having completed their assigned tasks. For Working Group 16 a letter, to be written by Dr. Bolt as Council Chairman, will serve as the Final Report.

In relation to the Working Groups given below the Executive Secretary was directed as follows:

1. Working Group 14. Summarize the technical points found in the several reports submitted to the Council for transmittal by the Council to the Navy Representative.
2. Working Group 16. Prepare a letter to the Air Force Representative stating that the evaluation could not be completed since the proposals were not sufficiently specific to permit their evaluation.
3. Working Group 18. Revise portions of the report and resubmit it to both the Working Group and the Council.

The Council approved a change in paragraph 5b of the By-Laws designed to recognize that the Working Groups report directly to the Council. The Executive Secretary was directed to circulate the proposed change to the Armed Services and NRC Representatives for their approval.

The Council approved the concept of an "enlarged Secretariat." In many cases the Armed Services have need for quick answers from CHABA on problems which do not require the deliberations of a formal Working Group. The Executive Secretary by himself, or assisted by one or two others, frequently can answer these requests, thus avoiding the lengthy process required to appoint a Working Group. For this reason, the Council empowered the Executive Secretary to answer such questions, without appointing a Working Group. Such answers, however, are the Executive Secretary's responsibility unless or until they are submitted to, and approved by, the Council.

The Council accepted and approved a report entitled "The Effects of Blast Phenomena on Man: An Evaluation and Recommended Approach" by D. H. Eldredge, Technical Aide. The evaluation and recommendations were based primarily on CHABA Report No. 3 and applied specifically to the Department of the Army. The report was transmitted to the Army.

Seven letters from the Air Force Council Representative requesting the appointment of Working Groups were discussed. Five of them were tabled until the Report of the Third Annual Meeting (subject "The Testing of Hearing in the Armed Forces") is published and evaluated. Working Group 24 was appointed to evaluate the progress made in designing and constructing jet engine silencers. Working Group 25 was appointed to recommend individual audiometric criteria for exposure to high intensity noise in order to establish guidelines by which the Airbase Flight Surgeons may be assisted in establishing and maintaining audiometric surveillance programs at Air Force installations.

Tenth Council Meeting: 5-6 December 1955, Wright Air Development Center

Interim reports were accepted from Working Groups 19, 21, 22, 24 and 25. Working Groups 2 and 16 were discharged. Working Group 19 was permitted to change its title from the "Method for Real-Ear Evaluation of Ear Protectors" to the more descriptive title of the "Method for the Measurement of Real-Ear Attenuation of Ear Protectors at Threshold."

Dr. Davis reported that the Secretariat had redrafted the material developed by Working Group 25 for the forthcoming Air Force revision of AFR 160-3 'Medical Services - Program to Control Hazardous Noise Exposure' to make it fit the format of that regulation.

The Council voted to permit the amendment of requests for Working Groups to show which of the other Armed Services is also interested in the results. In each case, the Service making the original request is to be clearly designated.

The Council discussed at length the philosophy underlying the distribution of CHABA reports. As a direct result, the Secretariat was requested to prepare a statement on past distribution policy for presentation at the Eleventh Council meeting.

The Council directed the Executive Secretary to appoint a special subcommittee to study the desirability of appointing social scientists as special consultants to the CHABA Council, or as members of CHABA.

The Council appointed Working Group 26 to plan the program for the Fourth Annual Meeting of the full CHABA Committee. The Council selected the topic "A General Review of Progress Since the Publishing of the Benox Report" as the subject for the next annual meeting.

The Executive Secretary reported that the required approvals of the change in paragraph 5b of the By-Laws had been received from the Armed Services and the National Research Council. The By-Laws are accordingly amended.

The Air Force Representative and Dr. H. E. von Gierke presented a detailed review of the current Air Force Noise and Vibration Control Program. The review was designed to acquaint the Council with the extent and nature of the program so that its adequacy might be commented upon. Council comments were delayed until the Eleventh meeting.

Eleventh Council Meeting: 1-2 March 1956, Central Institute for the Deaf

The Council accepted interim reports from Working Groups 22, 25 and 26. The materials developed by Working Groups 22 and 25 for the Air Force's revision of AFR 160-3 is only a part of their work. Both have been requested to review other documents for the Navy.

The Final Report of Working Group 18, changed as requested at the Ninth Council Meeting, was accepted by the Council and the Working Group was discharged. The Council discharged Working Group 19 since it had completed its mission of preparing a proposed American Standard. Working Group 27 was authorized to complete a document on physical measurement of the real-ear attenuation of ear protectors.

The Council accepted the Final Report of Working Group 21 and voted to discharge the Group with thanks. A draft of Working Group 24's Final Report was read to the Council by the Chairman, T. L. K. Snull. The Council approved the report in principle, and voted to discharge the Working Group effective with the submission of a fully edited Final Report to the Secretariat.

Dr. Davis reported that the Secretariat had redrafted the materials prepared by Working Groups 22 and 25 for the forthcoming Air Force revision of AFR 160-3 'Medical Services - Program to Control Hazardous Noise Exposure.' This was done since the two Working Groups could not hold additional sessions before the meeting of the Surgeon General's Ad Hoc Committee on Audiology early in January 1956.

The Council again discussed the subject of appointing consultants in the Social Sciences. The Secretariat, at the request of Dr. Edwin Newman, had prepared a "Summary History of the Study of Aircraft Noise" as background material for these discussions. The Council approved a memorandum prepared by Drs. Davis, Newman, Parrack, and Professor Rosenblith which was based on conversations between Drs. Newman and S. Stouffer of Harvard University. The Council directed Dr. Davis to continue his conversations with Dr. Newman with a view to forming a Working Group to deal with the general problem of the best use of the methods of the social sciences in the study of appropriate CHABA problems.

The Council considered the subject of an official CHABA news release concerning the noise generated by aircraft in the vicinity of air fields. Many government and private agencies have published information about this problem. Much of their information is misleading or inaccurate. The Council felt that an attempt should be made to



publish a more accurate statement of the problem. The Council concluded that the first step in this direction should be a descriptive statement about CHABA, the problems CHABA has faced, and the CHABA Council's assessment of bio-acoustic problems of the future. Drs. Davis and Bolt and Professor Rosenblith were directed to draft an appropriate review.

The review of the Air Force Noise and Vibration Control Program at the Tenth Council Meeting was discussed by the Council. Dr. Parrack reminded the Council that his objective in making the presentation was to obtain Council opinion as to what steps still needed to be taken to develop a well rounded program. The Council voted to endorse the approach found in the Air Force program, and directed the Executive Secretary to transmit this opinion to the Air Force Representative.

A proposed change in paragraph 2 of the By-Laws, previously circulated by the Secretariat, was discussed and an additional change was made and approved. The purpose of this change is to define more clearly CHABA's general fields of interest.

The Secretariat, at the Council's request, had prepared a statement on the policy governing the distribution of CHABA reports. Working Group reports that contribute to the background knowledge or technical knowledge in a field have been printed as green bound CHABA Reports. Many Working Group reports, however, give specific, detailed answers to specific questions, and, as such, may be thought of as "consultative" in nature. These reports have not, in the past, been published. The Council voted to publish selected "consultative" reports as "Memorandum Reports."

#### PROGRAM OF THE THIRD ANNUAL MEETING

The program for the Third Annual Meeting of the Armed Forces-National Research Council Committee on Hearing and Bio-Acoustics was prepared by Working Group 20. The program is presented below as a matter of interest in lieu of including it in the section on Working Group Reports. The meeting was held on 25-26 October 1955 in the Auditorium of the U.S. Naval Hospital at the National Naval Medical Center in Bethesda, Maryland. The Proceedings of this meeting will be published as CHABA Report No. 5.

## INTRODUCTORY PRESENTATION

Purposes of CHABA	R. H. Bolt, Massachusetts Institute of Technology
Welcome	Chairman, C. P. Phoebus, Captain, MC, USN, ONR
Welcome	W. E. Kellum, Captain, MC, USN

## THE TESTING OF HEARING IN THE ARMED SERVICES

### Principal Topic I What is Normal Hearing?

Chairman: E. B. Newman, Harvard University

Introductory Remarks	E. B. Newman
The Basis of the Present American Standard in the U.S.P.H.S. Survey	E. D. D. Dickson, Air Vice Marshal British Royal Air Force Central Medical Establishment
The Latest U.S. Survey: Wisconsin State Fair, 1954	W. W. Grings, Subcommittee on Noise in Industry
The Problem of a Common Standard of Reference	J. D. Harris, U.S. Naval Medical Research Laboratory
Steps Toward a Physical Standard of Reference	R. K. Cook, National Bureau of Standards
Measuring the Influence of Age, Masking, and Previous Noise Exposure on the Standard Audiogram	H. W. Rudmose, Southern Methodist University

### Principal Topic II Why Do We Use Audiometry?

Chairman: W. A. Rosenblith, Massachusetts Institute of Technology

Audiometry in Industry Placement	C. I. Barron, M.D., Lockheed Aircraft Corporation
Industrial Compensation for Hearing Loss	H. A. Nelson Wisconsin Industrial Commission
Veterans' Compensation for Hearing Loss	K. Johnson Veterans Administration
Diagnostic Audiometry	G. D. Hoople, M.D. University of Syracuse

Should Trained Men be Disqualified for Hearing Losses? R. McFarland  
Harvard School of Public Health

Standards for Physical Fitness: Army C. B. Meador, Colonel, MC, USA

Standards for Physical Fitness: Navy B. D. Casteel, Captain, MC, USN

Standards for Physical Fitness: Air Force: R. K. Miller, Major, MC, USAF

Hearing Qualifications for Special Military Assignments V. Fields  
Bureau of Naval Personnel

Summary: The Present Position of Working Group 2 "Standards and Methods for the Testing of Hearing" A. Glorig, M.D., Subcommittee on Noise in Industry

Closing Remarks by the Chairman W. A. Rosenblith

Principal Topic III Problems in Getting the Job Done

Chairman: C. P. Phoebus, Captain, MC, USN, ONR

A Classification of Hearing Tests I. J. Hirsh  
Central Institute for the Deaf

Review of "Report by Working Group on Military Audiometry" R. Carhart  
Northwestern University

Automatic Audiometry J. C. Webster  
U.S. Navy Electronics Laboratory

Practical Limitations in Military and Industrial Audiometry A. Glorig, M.C.  
Subcommittee on Noise in Industry

Report to the CHABA Committee on the Deliberations of the Air Force Surgeon General's Ad Hoc Committee for Audiology C. M. Kos, M.D.  
State University of Iowa

Recapitulation Hallowell Davis, M.D.  
Central Institute for the Deaf

Discussion

### Other CHABA Business

Executive Secretary's Report      Hallowell Davis, M.D.  
Central Institute for the Deaf

### Working Group Reports:

9	Review and Evaluation of a Sample of Everyday Speech	Chairman, G. Fairbanks
15	Evaluation of a Research Proposal of the National Bureau of Standards	Chairman, H. Davis
18	Requirements for Air Base Noise Surveys	Chairman, H. W. Rudmose
19	Method for Real-Ear Evaluation of Ear Protectors	Chairman, I. J. Hirsh
21	Hearing Conservation Data	Chairman, R. O. Fehr
22	Criteria for Hazardous Noise Exposure	Chairman, W. A. Rosenblith

### Appendix I

Audiometry in the Armed Forces: A Commentary by the CHABA Council

## SUMMARY OF WORKING GROUP ACTIVITIES\*\*

### WORKING GROUP #2

#### "Standards and Methods for the Testing of Hearing"

Status: Discharged (2 December 1955)

Requested by: 5 May 1953 CHABA Council Meeting

Purpose: To explore the problems of international standards for audiometry.

Membership:

Aram Glorig, Chairman	
Willis Beasley*	J. Donald Harris
Raymond Carhart	Ira J. Hirsh*
Richard K. Cook	Gordon D. Hoople
Elizabeth Guild,	Scott N. Reger*
Major, USAF	

Meetings: 6, 7 April 1954  
28, 29 June 1955, State College, Pennsylvania

Activities: Dr. Glorig, the Chairman, attended the June-July 1953 International Congress of Audiology, Otolaryngology and Electro-Acoustics in the Netherlands, in the interest of discussing the physical measurement, psychophysical techniques and the rationale that should be used in defining an International Standard for the threshold of hearing. He discussed the same subject with Dr. Lüscher in Switzerland, Mr. Dadson of the National Physical Laboratory (England) and Air Vice Marshal Dickson of the RAF Central Medical Establishment. Dr. Glorig summarized the information he had received in a speech to the First CHABA meeting in October 1953. His comments, entitled "International Standard for Audiometry," were distributed to the CHABA membership in December 1953.

At the 6-7 April 1954 meeting, the Working Group considered the apparent difference between the "normal thresholds" defined by the U.S. Public Health Survey and by the National Physical Laboratory (England).

\* By invitation  
\*\* See the earlier Annual reports for previous reports concerning these Working Groups and for Working Groups whose tasks were completed before 1 June 1955.

The Working Group carefully examined the method by which each standard was obtained to determine the importance of the difference in approach. One major source of difficulty lay in the different methods used to select the test populations. Another lay in the different measurements used to specify threshold sound pressure levels. The Working Group recommended that the data basic to the U. S. Public Health Survey be reviewed to see if there are portions conforming to the National Physical Laboratory methods which can be selected for direct comparison.

In the course of other work Drs. Cook and Beasley explored the extent to which the above objectives could be attained. At a meeting on 28, 29 June 1955 the Working Group learned that, for the USPH Survey, a satisfactory check on sound pressure level at threshold in the ear canal was not possible. Although the population data had been reviewed and was on IBM cards in a form suitable for further analysis, such analysis was considered unprofitable without the corresponding physical data. The Working Group then agreed on the major conclusions listed below.

In September 1955 Dr. Cook attended a meeting of the International Standards Organization (ISO TC-43) in Berne, Switzerland. He reported that ISO TC-43 is prepared to wait another year for more data before attempting to reach an agreement on an international standard for the threshold of hearing.

#### Reports:

1. 9 October 1953, to the Full CHABA Committee. "International Standards for Audiometry," by A. Glorig.
2. 7 April 1954, to the CHABA Council. Preliminary Report.
3. 26 October 1955, to the Full CHABA Committee. "The Present Position of Working Group 2," by A. Glorig.

#### Major Conclusions:

1. European countries are in the process of adopting as standard audiometric zero the thresholds reported by Dadson and King and by Wheeler and Dickson. These thresholds approximate those reported by Sivian and White.
2. The specification of normal thresholds of hearing in the present American Standard on Audiometers is unsatisfactory, but should be retained until evidence

is accumulated on the basis of which a better specification can be written. Such evidence may result from studies now under way. These consist of new surveys and attempts to express the American and British standards in comparable terms.

3. The current investigations bearing on this problem such as are now in progress at the National Bureau of Standards and the Walter Reed Army Medical Center should be supported.

4. Future studies on normal hearing should be better controlled. A set of principles has been suggested as a guide for future studies.

#### WORKING GROUP #9

##### "Review and Evaluation of a Sample of Everyday Speech"

Status: Discharged (24 October 1955)

Requested by: Letter of 12 November 1953 from Dr. Howard House,  
Chairman of the Subcommittee on Noise in Industry.

Purpose: To determine the extent to which certain recordings made at the Central Institute for the Deaf represent a reasonable sample of "everyday speech." To determine if a test based on these or similar recordings might be used as a primary measure of hearing disability.

Membership:  
Grant Fairbanks, Chairman  
James F. Curtis\* James P. Egan\*  
Harold Whitehall\*

Meetings: None since 1 June 1954.

Activities: Following the submission to the Central Institute for the Deaf of an informal, preliminary report which suggested many specific recommendations for improvement of the speech samples, the Working Group reviewed, first in written and then in recorded form, a new set of sentences prepared at the Central Institute for the Deaf in accordance with these recommendations. Final recommendation and a critique have been prepared. The recordings were used by Dr. Glorig at the Wisconsin State Fair of August 1955, with apparently satisfactory results.

Reports: 1. 1 April 1954, to the Central Institute for the Deaf (CID) informal preliminary report.

\* By invitation

2. July 1954, to CID. Approved a revised list of 200 sentences.
3. 16 May 1955, to the CHABA Council. Informal draft of the final report.
4. 25 October 1955, to the full CHABA Committee. Formal report of Working Group activities.

Major conclusions:

1. The material is satisfactory as a sample of the American language. The talkers are nearly, although not completely, satisfactory. The CID recorded effort is very close to being a reasonable sample of everyday speech.
2. The problem is now in the stage of devising a method of scoring performance, constructing a test from the material and validating the test.
3. The Working Group recommends it be discharged. It is ready, however, to stand by to give further recommendations in case small-scale tests with naive listeners reveal unsuspected faults in the material.

WORKING GROUP 14

"Navy Group Audiometer Development"

Status: Discharged (24 October 1955)

Requested by: Letter in April 1954 from Dr. H. A. Imus

Purpose: To provide the Navy with specifications for an Automatic Group Audiometer.

Membership:

	Edwin B. Newman, Chairman
	Ira J. Hirsh, Vice-Chairman
Robert W. Benson*	J. Donald Harris
Mark B. Gardner*	John C. Webster*

Consultants:

A. Glorig	C. L. Schilling, Capt. (MC)	USN*
F. Brogan	F. Harbert, Capt. (MC)	USN (ret.)*

Meetings: 3-4 September, 1954, New York, New York  
29 June 1955, State College, Pennsylvania

\* By invitation



Activities:

In September, 1954, the Working Group recommended that a particular test procedure be recorded on magnetic tape and tested at the Naval Electronics Laboratory, at the Naval School of Aviation Medicine, Pensacola, Florida, and at the Naval Medical Research Laboratory at New London, Connecticut. The trials were carried out as recommended.

Dr. Harris, at the 29 June 1955 meeting, reported on the results of the field trials. These included tests on personnel at the Navy Electronics Laboratory (conducted by J. C. Webster), the Naval School of Aviation Medicine (conducted by W. D. Ward), and the Naval Medical Research Laboratories (conducted by J. D. Harris). The field trials indicated that the particular form of the test is feasible.

The Working Group reported that their audiometric test procedure could be automatically presented by any one of a number of methods which might use oscillators with automatic mechanical switches, magnetic tape recording, etc. The test had been successfully recorded on special 2 mil magnetic tape for trial purposes, but other methods may prove to be equally, or more, satisfactory.

The CHABA Council directed the Executive Secretary to prepare a summary of the technical reports submitted by this Working Group. This summary has been transmitted to the Navy Representative by the Council.

Reports:

1. 24 October 1954, informal report to the Council.
- 24 October 1955, final report to the Council.

Major Conclusions:

1. An audiometric test, to be suitable for Navy purposes, should include three basic features:
  - a. It should be a group test
  - b. It should employ pulsed tones
  - c. It should require the listeners to choose a number which represents the number of tones heard in a given tone-group.
2. Formulation of specifications for the technical means to be used in giving this test will be possible only after a careful review of the requirements has been made by competent engineers and potential manufacturers.
3. Since the field trials have been satisfactorily completed, the Working Group recommends that the Navy request bids from various manufacturers for the development of apparatus for the test.

WORKING GROUP 15

"Evaluation of National Bureau of Standards  
Research Proposal for the Army Medical Service"

Status: Discharged (24 October 1955)

Request: Letter from Colonel C. S. Gersoni, dated 23 July 1955.

Purpose: To evaluate the renewal application of the proposal entitled "Proposal for Research into Methods for Standardization of Hearing Diagnostic Instruments" submitted by the National Bureau of Standards.

Membership:

Hallowell Davis, Chairman
Robert W. Benson* Harvey Fletcher
Raymond Carhart J. Donald Harris

Meetings: None

Activities: In 1954 Working Group 15 approved the original proposal submitted by Dr. R. K. Cook to the National Bureau of Standards. The Council reactivated the Working Group to review the proposal for continuing this work. The review was done by mail, and the Council approved the Working Group report by mail ballot.

Reports:

1. Letter to Major Albrite, Army Council Representative, for transmission to Colonel Gersoni, 12 October 1955.

Major Conclusions:

1. The proposal deserves support.
2. The proposal is well conceived, technically sound and carefully planned.
3. The work is now actively in progress, and the increasing interest in the possibility of international standards for audiometry lends additional significance to the research.

\* By invitation

WORKING GROUP 16

"Evaluation of AIA Research Proposals for the Air Force"

Status: Discharged (1 December 1955)

Requested by: Letter of 22 June 1954 from Major H. O. Parrack

Purpose: To evaluate five proposals submitted to the Air Force by the Aircraft Industries Association for research on the problem of aircraft noise control.

Membership: None appointed.

Activities: These proposals were considered by the Council. The Secretariat prepared the report to Dr. Parrack.

Reports: Letter to Dr. H. O. Parrack dated 1 February 1956.

Major Conclusions:

The purposes, as submitted, did not include sufficient information to permit evaluation.

WORKING GROUP 18

"Requirements for Air Base Noise Surveys"

Status: Discharged (1 March 1956)

Requested by: Major H. O. Parrack at the 24 October 1954 Council meeting. Modified to a joint Armed Services request by the Council on 5 December 1955.

Purpose: To establish a standard noise survey procedure for Air Force bases.

Membership:

Wayne Rudmose, Chairman  
Donald H. Eldredge                      Howard C. Hardy\*  
Henning E. von Gierke                  Samuel Labate\*  
Kenneth N. Stevens\*

Meetings: 5 November 1954, Dayton, Ohio  
18-20 November 1954, Austin, Texas

Activities: At the Council's request, the Working Group's Final Report was revised several times, by mail.

Reports: Final Report, 1 June 1955; endorsed by CHABA Council 1 March 1956.

\* By invitation

### Major Conclusions:

1. The present accumulation of basic knowledge is insufficient to permit a reasonably routine survey procedure to be devised.
2. An Air Force Agency having a research orientation should direct or conduct intensive surveys, designed to acquire necessary basic knowledge, at two to four airbases.
3. The data obtained should be analyzed and organized in such a way that the information on specific noise sources, atmospheric effects, etc., will be maximally useful in reducing the magnitude of air base noise surveys in the future.

### WORKING GROUP #19

#### " A Standard Method for Measuring Real-Ear Attenuation of Ear Protectors at Threshold"

Status: Discharged (1 March 1956)

Requested by: Major H. O. Parrack at the 24 October 1954 Council meeting. Modified to a joint Armed Services request by the Council on 5 December 1955.

Purpose: To provide for the Department of Defense a tentative standard method for the real-ear evaluation of ear defenders, to be used until the American Standards Association develops a definitive standard.

#### Membership:

Ira J. Hirsh, Chairman	
Robert S. Gales	Martin L. Touger*
Henning E. von Gierke	Paul S. Veneklasen*
Elizabeth Guild,	Douglas E. Wheeler
Major, USAF	Josef F. Zwislocki
W. A. Shaw*	

Note: As Subcommittee Z 24-W-26 of the American Standards Association, this group had already begun the preparation of such a standard.

Meetings: 18 November 1954, Texas  
28 June 1955, State College, Pennsylvania

Activities: The Working Group has written a proposed American Standard and has submitted it for review to the American Standards Sectional Committee Z-24. The preparation of

\* By invitation

a second document, covering certain physical measurements of the attenuating properties of ear protectors, has been referred to Working Group 27, which was appointed for this purpose.

Reports: 1. 30 August 1955 "Standard Method for the Measurement of Real Ear Attenuation of Ear Protectors."

Major Conclusions:

The principles and the details of a method for evaluating the real-ear attenuation provided by ear protectors when worn in or on human ears can be described in a standard manner.

WORKING GROUP 20

"Program for the Third CHABA Meeting"

Status: Discharged (24 October 1955)

Requested by: CHABA Council, 28 January 1955

Purpose: To plan and execute the program for the 25-26 October 1955 meeting of CHABA

Membership:

Edwin B. Newman, Chairman  
Raymond Carhart                      Hallowell Davis  
Aram Glorig

Advisors:

Harvey Fletcher                      Clifford P. Phoebus, Captain  
USN

Meetings: 14 May 1955, Chicago, Illinois  
3 July 1955, Chicago, Illinois

Activities: The program for the Third Annual CHABA Meeting was prepared, and guest speakers were invited to participate.

Reports: 1. 16 May 1955, informal report to the Council  
2. 25-26 October 1955, the Third Annual Meeting (See page 27 of this Report for the program of the meeting.)

Major Conclusions:

None

"Hearing Conservation Data and Procedure"

Status: Discharged (18 May 1956)

Requested by: Dr. H. O. Parrack at the 26 May 1955 Council Meeting

Purpose: To coordinate the collection of data from conservation of hearing programs conducted by industry and the Department of Defense.

Membership:

Robert O. Fehr, Chairman	
Hallowell Davis	<u>Army:</u>
Aram Glorig	John R. Hall, Jr., Col., (MC)
Walter A. Rosenblith	Lee H. Miller, Capt., (MC)
J. R. Usher	R. E. Shutts
(Secretary)	
<u>Navy:</u>	<u>Air Force:</u>
J. Siegel, Cdr. (MSC)	Francis Brogan
	Ronald Hansen, Capt.*
	Charles N. Moss, Major (MC)
	H. O. Parrack (Advisor)

Meetings: 27-28 July 1955, Los Angeles, California  
 5 October 1955 (sub group), Evendale, Ohio  
 13-14 October 1955 (sub group), Tullahoma, Tenn.  
 26 October 1955, Washington, D.C.

Activities and Conclusions:

A model data card has been prepared, based on original work at the Research Center of the Subcommittee on Noise in Industry. It will elicit the minimum information necessary to eventually establish a relationship between hearing loss and noise exposure. The Armed Services (and Industry) may add to it such other information as they need for their own information or medical purposes. By using this data card form and submitting completed copies to the Research Center of the Subcommittee on Noise in Industry, the Armed Services and Industry can contribute to the pool of information that is being collected to better define the relations of hearing loss to noise exposures.

The Working Group suggests that the Armed Forces use the data card form for a trial period before considering the development of a tri-Service data card form.

Reports:

1. 9 August 1955, informal report
2. 25 October 1955, formal report to full CHABA meeting
3. 1 March 1956, final Report, (to be printed as Memorandum Report No. 2).

\* By invitation

"Criteria for Hazardous Noise Exposures"

Status: Active

Requested by: Captain Edward H. Headley (MC) USA of the Environmental Health Laboratory, Army Chemical Center, by letter forwarded to the Council by Major Albrite on 15 April 1955. Modified by Council action to a joint Armed Services request on 5 December 1955.

Purpose: To distinguish a hazardous from a non-hazardous noise exposure.

Membership:

Walter A. Rosenblith, Chairman	
C. I. Barron	<u>Air Force:</u>
Aram Glorig	J. C. Carmichael, Lt. Col.
Gordon Hoople	H. von Gierke (MSC)
Wayne Rudmose	Karl Kryter
H. Schuknecht	C. N. Moss, Lt. Col. (MC)
J. R. Usher	R. F. Thompson, Major
(Secretary)	H. O. Parrack (advisory)
<u>Army:</u>	<u>Navy:</u>
John R. Hall, Col. (MSC)	Morris Lindman
Lee H. Miller, Capt. (MC)	J. Siegel, Cdr. (MSC)
R. Edwin Shutts	J. Webster

Meetings: 26 October 1955, Washington, D. C.  
11-26 December 1955, Boston, Massachusetts

Activities: The Working Group reviewed a proposed revision of the Air Force Regulation entitled: "Medical Services - Hearing Conservation Program," (AFR 160-3). Criteria were developed for short and long term exposure of military personnel to high intensity jet engine noises, using ear protection. The criteria were based on material found in Vol. II of the Handbook of Acoustic Noise Control.

This material was submitted to the Air Force for review\* and possible incorporation in the new version of AFR 160-3. The Air Force has submitted its new redraft to the Working Group for comment.

\* Note: The Secretariat combined this material with the medical disposition material developed by Working Group 25. The combined, and redrafted, materials were presented by the Secretariat to a meeting of the Air Force Surgeon General's Ad Hoc Committee on Audiology in January 1956.

The Working Group has been requested, by the Navy, to review Bureau of Ships Report No. 371-N-27 "Noise Level Limits for the Avoidance of Deafness in Ship-board Machinery Spaces," and Bureau of Medicine and Surgery Instruction 6260.6 "Hearing Conservation Programs."

Reports: 1 March 1956, Interim Report.

Major Conclusions:

The criteria for hazardous noise exposures given in Volume II of the Handbook of Acoustic Noise Control for long term exposures, or derived from them by the equal energy rule for short term exposures, are consistent with present information. These criteria should be used as interim criteria until more data relevant to the problem are available.

WORKING GROUP 23

"Evaluation of a Research Proposal Entitled 'Investigation of the Effects of Focused Ultrasound Upon the Central Nervous System'"

Status: Discharged (24 October 1955)

Requested by: Letter of 23 September 1955 from Dr. Philip S. Owen, Executive Officer, Division of Medical Sciences of the National Research Council.

Purpose: To evaluate a research proposal submitted to the National Research Council.

Membership:

Hallowell Davis, Chairman	
Harlow Ades	Robert Galambos
William J. Fry*	Victor Guillemin, Jr.*

Meetings: None

Activities: The evaluation and review of the proposal was conducted by mail.

Reports: 24 October 1955, Final Report

Major Conclusions:

1. The Research Proposal is worthy of continued financial assistance from the National Research Council.
2. The research should advance knowledge of the mechanism of cellular injury by ultrasound and of the effects on the central nervous system of particular localized injuries to capillaries and to the blood-brain barrier.

\*By invitation



"Evaluating Jet Engine Noise Suppressors"

Status: Discharged (14 March 1956)

Requested by: Letter of 18 October 1955 from Dr. H. O. Parrack, the Air Force Council Representative.

Purpose: To review the data accumulated from experimental jet engine silencers to obtain quantitative estimates of:

- a) the performance penalty inflicted
- b) the acoustic effectiveness
- c) silencer availability in point of time
- d) the complexity of and serviceability of the associated devices.

Membership:

T. L. K. Smull, Chairman  
L. L. Beranek Newell Sanders\*  
H. E. von Gierke P. J. Westervelt\*

Meetings: 23 February 1956, Cleveland, Ohio

Activities: The consultants considered the problem individually before meeting to prepare their final report.

Reports: 1 March 1956, Final Report. (To be published as Memorandum Report No. 1)

Major Conclusions:

1. The overall noise reduction obtained through the use of noise suppressing devices will be small, and the acoustic power level may be reduced by 4 to 6 db. Sound pressure levels in the direction of maximum intensity will be reduced about 10-12 db.
2. Static thrust losses may vary from 1% to 5% depending upon the design of the device.
3. Suppressing devices may be ready for regular service in about three years.
4. Engineering considerations now limit these devices to jet engines without afterburners.

\* By invitation

WORKING GROUP 25

"Individual Audiometric Criteria"

Status: Active

Requested by: Dr. H. O. Parrack by letter dated 10 October 1955

Purpose: To develop criteria for using audiometric information in relation to job assignment in a noise-hazardous situation.

Membership:

Gordon Hoople, Chairman	
Raymond Carhart	<u>Air Force:</u>
Hallowell Davis	J. C. Carmichael, Lt. Col.
Aram Glorig	C. M. Kos (MSC)
Thrift Hanks*	R. N. Kraus, Col. (MC)
Ira Hirsh	C. N. Moss, Lt. Col. (MC)
Walter Rosenblith	H. O. Parrack
J. R. Usher	
(Secretary)	

Army:

John R. Hall, Col. (MSC)	B. D. Casteel, Capt. (MC)*
C. B. Meador, Col. (MC)	J. E. Rasmussen, Lt. (MSC)*

Meetings: 20-21 November 1955, Chicago, Illinois

Activities: At the request of the Air Force the Working Group drafted a regulation to govern the medical disposition of personnel who are to be or have been assigned to noise-hazardous areas. The Secretariat edited this material, combined it with that prepared by Working Group 22, and presented it in January 1956 to the Air Force Surgeon General's Ad Hoc Committee on Audiology for inclusion in the forthcoming revision of AFR 160-3 "Medical Service-Hearing Conservation Programs."

Preliminary Conclusions:

1. A long term problem exists in this area, which includes the following questions:
  - a) how much hearing loss on the first audiogram disqualifies a man for an assignment in a noise-hazardous situation?
  - b) how should the audiometric data be considered when making the original duty assignment?
  - c) should speech audiometry be used in making duty assignment?
2. Recommendations have been made to the Air Force regarding the medical disposition of persons showing various types of hearing losses when given audiometric tests.

\* By invitation

WORKING GROUP 26

"Program for Fourth Annual Meeting of CHABA"

Status: Active

Requested by: 6 December 1955 CHABA Council Meeting

Purpose: To plan the program for the Fourth Annual CHABA meeting

Membership:

Donald H. Eldredge, Chairman  
Richard H. Bolt  
W. Dewey Neff

Navy:

Air Force:

Karl Kryter  
H. O. Parrack

Wilbert Annis  
Robert S. Gales  
(J. P. Webster, Alternate)  
C. P. Phoebus, Capt. (MC) USN

Army:

C. S. Gersoni, Col. (MSC) USA

Meetings: 19 April 1956, Chicago, Illinois

Activities: Preparation of plans for the Fall meeting of CHABA. The major topic for presentation concerns the progress made in the man-noise area in the past three years. The meeting will be held on 30-31 October at the Auditorium of the National Academy of Sciences - National Research Council in Washington, D.C.

Reports: None

Major Conclusions:

None

WORKING GROUP 27

"Standard Method for the Measurement of the Attenuation of Ear Protectors on Artificial Ears"

Status: Discharged (7 June 1956)

Requested by: The Council, 1 March 1956

Purpose: To write a document describing a standard method for the measurement of the attenuation produced by Ear Protectors

Membership: To be selected

WORKING GROUP 28

"Review of the Sociological and Social-Psychological Aspects  
of the Air Force Program for Research in the Area of  
Community Reaction to Noise"

Status: Active

Requested by: The Council, 6 December 1955

Purpose: To determine if the research methods used by the Social Sciences can be of help in solving CHABA problems.

Membership:

Edwin B. Newman, Chairman	
Raymond Bowers*	Howard Page*
Daniel C. Camp*	H. O. Parrack
Glen Finch	David Rioch
Philip Hauser*	Walter A. Rosenblith

Meetings: None yet

PUBLISHED REPORTS

"High Intensity Noise and Military Operations: An Evaluation."  
25 January 1954. CHABA Report No. 1. Technical Report No. 1 to the Office of Naval Research.

First Annual Report of the Armed Forces-National Research Council Committee on Hearing and Bio-Acoustics. 1 June 1954. CHABA Report No. 2. Technical Report No. 2 to the Office of Naval Research.

Second Annual Report of the Armed Forces-National Research Council Committee on Hearing and Bio-Acoustics. 1 June 1955. Technical Report No. 3 to the Office of Naval Research.

"The Effects of Blast Phenomena on Man," by D. H. Eldredge, 1 September 1955, CHABA Report No. 3. Technical Report No. 4 to the Office of Naval Research.

"Noise and the Community" - The Proceedings of the Second Meeting of the Armed Forces-National Research Council Committee on Hearing and Bio-Acoustics, a joint meeting with the National Advisory Committee for Aeronautics Special Subcommittee on Aircraft Noise, 25-26 October 1954. October, 1955. CHABA Report No. 4. Technical Report No. 5 to the Office of Naval Research.

"The Testing of Hearing in the Armed Services," - The Proceedings of the Third Annual Meeting of the Armed Forces-National Research Council Committee on Hearing and Bio-Acoustics, 25-26 October 1955. 1 June 1956. CHABA Report No. 5, in preparation. Technical Report No. 8 to the Office of Naval Research.

\* By invitation

"Evaluation of Methods for Reducing Noise from Jet Engines in Flight" Report of Working Group 24. May, 1956. CHABA Memorandum Report No. 1. Technical Report No. 6 to the Office of Naval Research.

"Hearing Conservation Data and Procedures," Report of Working Group 21. June, 1956. CHABA Memorandum Report No. 2. Technical Report No. 7 to the Office of Naval Research.

"Third Annual Report of the Armed Forces-National Research Council Committee on Hearing and Bio-Acoustics," 1 June 1956. Technical Report No. 9 to the Office of Naval Research.

OTHER ACTIVITIES SPONSORED BY THE OFFICE  
OF THE EXECUTIVE SECRETARY

The Expanded Secretariat has been requested by Dr. Philip Owen, Executive Officer of the National Research Council, to evaluate a research proposal submitted to the Office of Naval Research, which involves the use of ultrasonics as a tool in biological research.

The Executive Secretary, in collaboration with Drs. Bolt and Parrack and Professor Rosenblith, is drafting a "Three Year Review of CHABA Activity" in accordance with the instructions of the Council.